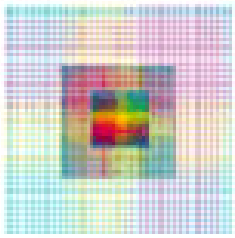

AUDIT II

Country Report
SLOVENIA

Damjan Zagozen

Final Report 8. 8. 2002

SUMMARY OF ENERGY AUDITING

Background and Present National Policy

Since 1991 up to the year 2002 about 170 energy audits have been performed and subsidised up to 50 % almost every year. The energy Auditing Programme started in 1992 in the scope of the project "Encouraging energy efficiency in industry and buildings". In 1995 started the ”Global energy auditing implementation" project and in 1996 an international PHARE project with the title “Energy Audits and Training of Auditors in Slovenia”.

Energy efficiency and renewable energy sources represent a major part in the national energy policy. An important interim document was the *Resolution on the Strategy of Use and Supply of Energy in Slovenia* in 1996. 1999 the new *Energy Law* covering energy efficiency, renewable energy sources and greenhouse gas mitigation instruments passed the Parliament. It directly addresses energy efficiency and indirectly energy audits.

A number of energy efficiency programmes have been designed and supported by the governmental budget and by the PHARE Programme. The goal of subsidising energy audits and energy consulting is to develop the energy service market and to increase the awareness and investments in energy efficiency.

Energy Audit Programmes

Energy Auditing Programme

The energy auditing programme is aimed at introducing energy management and promoting energy efficiency measures and investments in the industrial, commercial and public sector, and in the apartment block buildings. An energy audit results in a list of proposals of organisational measures and investment proposals. It presents a basis for developing a site strategy to reduce energy consumption and increase energy efficiency. The audits have to be performed according to the common methodology. The audits are subsidised by up to 50% of the total costs.

In the year 2001 two public calls for this programme were published. The operating actor has been the Ministry of Environment and Spatial Planning, Agency of the Republic of Slovenia for Efficient Energy Use.

First one is the public call for subsidising municipalities and public institutions to implement energy audits of public buildings and public institutions. The range of subsidy is 1.100 to 7.800 €, but not more than 50% of the energy audit costs. The call has been opened since September 2001 to April 2002. In 2001 nine energy audits were subsidised.

The second one is the public call for subsidising energy audits of companies and multi-apartment buildings in the range of 1.100 to 8.600 €, but not more than 50% of the energy audit costs. It has been opened since October 2001 to May 2002. Companies and also private persons can attend the call. In 2001 fourteen energy audits were subsidised.

Other Programmes with Energy Audits

Energy advisory network in Slovenia – ENSVET

During nine years of the ENSVET project, 24 energy advisory offices and 9 subsidiaries have been established following the state and municipal inniciative and support. The Energy Advisory Network is now uniformly dispersed all over Slovenia, with average distance from the customer to the office not exceeding 20 km. Current extent is 33 offices and 73 advisers. Energy advisors offer advises to the households with the aim: to raise energy efficient awareness, to promote and stimulate implementation of energy efficient measures and the use of renewable energy sources. They also take part in education of new advisers, contribute to promotion of the ENSVET and energy efficiency, improving their knowledge and transferring new approaches in operational scheme of the project. Advises are free of charge for the customers.

Voluntary Agreements (Planned)

Modifications of currently ongoing CO_2 regulation are foreseen by the middle of the year 2002, prepared by the Ministry of Environment and Spatial Planning. The changes are going in the direction of introducing CO_2 tax exemptions for IPPC industry obligors using voluntary agreement model. Tax exemptions are foreseen for the costs regarding short to long-term investments in energy efficiency measures and equipment. And energy audit is quite appropriate way to define them.

Other Activities including Energy Audits

Energy consulting to larger industrial energy consumers

The project aim is to raise information and awareness in the field of energy efficiency and energy management in enterprises with high energy bills. The project goal has been set to overcome information barriers and, through transferring independent and direct information to managing staff and energy operators, to activate internal potentials for increasing efficiency of energy use. Very important is also introducing energy management and modern energy technologies as well as setting up enterprise energy strategy, which starts with the carrying out of basic organisational measures of reducing energy costs and later embraces energy projects. Since 1997 energy consulting was carried out in 44 industrial companies, in a hospital, in a municipal sewage draining – water supply system and in a chain of department stores. Project is 100% financed by the Ministry of the Environment and Spatial Planning - Agency for Efficient Energy Use in Slovenia.

Fund for Energy Efficient Investments

Fund for Energy Efficient Investments was established in January 1998. The fund goal is to provide the industrial enterprises, institutions and building managers with financial resources under attractive interest rates. It is managed by the Bank Austria and supplied from a mix of financial sources. An attractive all-in interest rate on the level of 60 % of commercial interest rate is achieved by a grant from the national budget of the Republic of Slovenia and by a zero-interest loan granted by the European Union PHARE Programme. Investments that are analysed and foreseen within the energy audit are very competitive for a loan with subsidised interest rate.

Seminars, Workshops, Awards

Each year several seminars and workshops supporting energy efficiency activities in industry and public sector are organised, (co)financed mostly by the Ministry of the Environment and Spatial Planning - Agency for Efficient Energy Use in Slovenia. Every year Energy Award for energy efficient organisation and project is given.

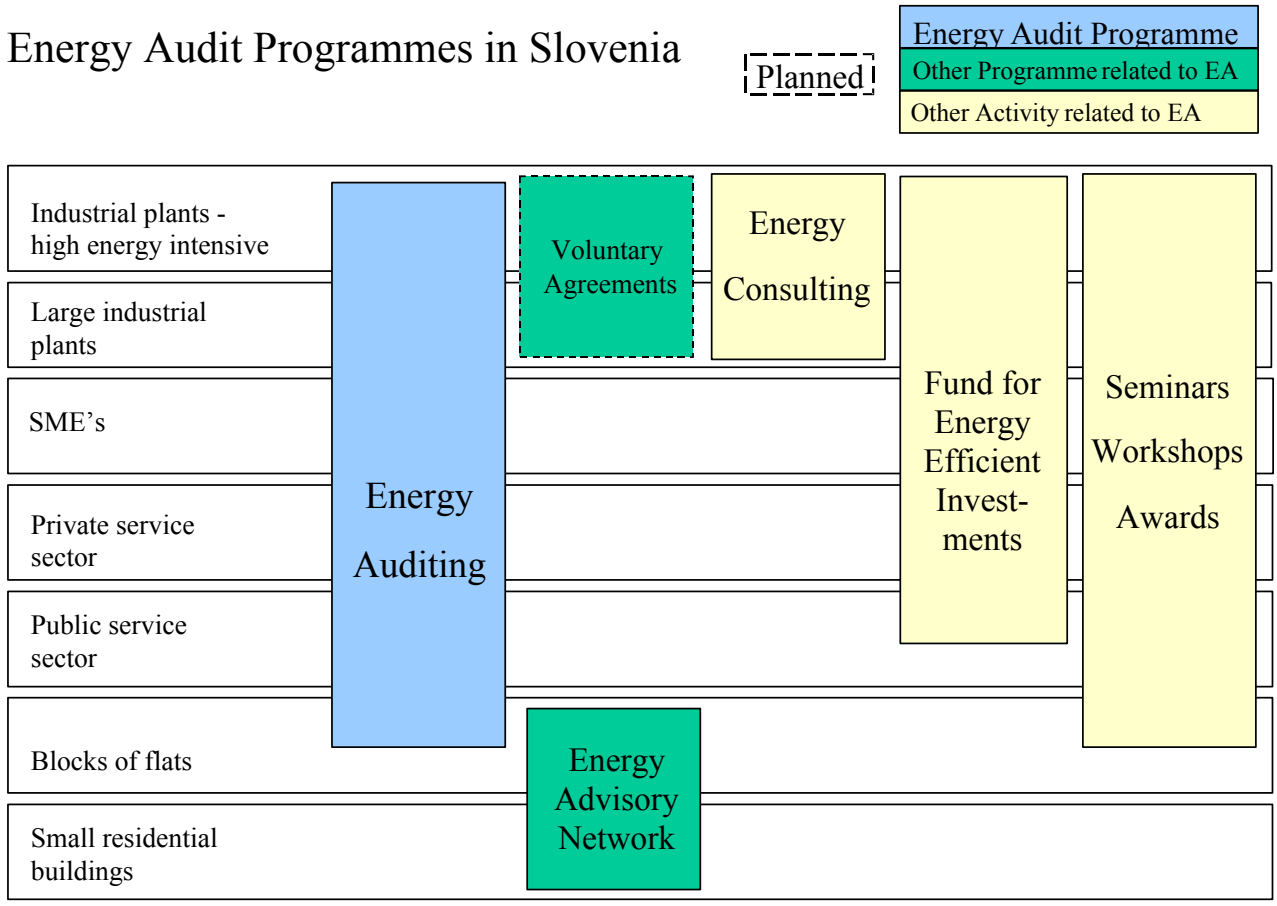

Table of EAP features coverage (incl. other programmes and other activities with energy audits)

	Energy Auditing Programme	**Energy advisory network**	**Energy consulting**
Status	1992-	1992-	1997-
Administration	+++	+++	+++
EA models	++	++	++
Auditors' tools	++	+++	++
Training, authorisation	+++	+++	++
Quality control	++	++	++
Monitoring	++	++	+++
Volumes, results	++	++	+++
Evaluation	++	++	++

+++ = Detailed information available
++ = Some information available
+ = Very little information available
= No information available / does not exist

Contacts

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Country Report

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Disclaimer

The information contained in this report has been gathered from publicly available sources and through interviews. All efforts have been made to secure the veracity of the report, however the authors cannot guarantee the content.

Table of Content

COUNTRY REPORT

1. Background and Present National Policy

Previous activities

Since 1991 to the year 2002 around 173 energy audits have been performed and subsidised up to 50 % almost every year. Most of them (157) have been supported by energy auditing programme and some of them (16) by PHARE programme. 101 energy audits were applied to industry and 72 to buildings.

Energy Auditing Programme started in 1992 in the scope of project "Encouraging energy efficiency in industry and buildings". The project included a design of the Energy Audit Methodology and realisation of the pilot energy audit.

In 1995 first started ”Global energy auditing implementation" project and then in 1996 an international PHARE project “Energy Audits and Training of Auditors in Slovenia”. Project “Global energy auditing implementation” was mostly provided by “Jožef Stefan” Institute - Energy Efficiency Centre and financed by the Slovenian Ministry of Economic Affairs - Agency for Efficient Energy Use in Slovenia. Both projects finished by the end of 1997, but energy audits are still subsidised almost every year since 1998.

Present national policy

In the more recent history, energy efficiency and support of renewable energy sources has been established as a major component in the national energy policy by the first government in the independent Slovenia in 1991. The *Energy Law*[1] covering substantial energy efficiency, renewable energy sources and greenhouse gas mitigation instruments passed the Parliament in 1999, replacing the Law on energy economy of 1986. An important interim document was the *Resolution on the Strategy of Use and Supply of Energy in Slovenia* in 1996[2].

The new *Energy Law* directly addresses energy efficiency (EE) and indirectly energy audits with the following clauses:

- preference of EE and RES options (over supply options) (Article 10),
- EE and promotion of RES as elements of energy policy (Article 13),
- effectiveness of EE and RES activities are to be evaluated, the evaluation procedure is to be defined by the minister, responsible for energy (Article 65.),
- suppliers may include cost for EE and RES promotion or subsidisation in their price calculation, on approval by the Ministry, (Article 67.),
- minimum efficiency standards and labelling for products, including buildings (Article 68.),
- mention of (optional) local energy concepts, (Article 17),
- obligation to measure energy (Article 93).

Considering the relatively high energy saving potential both in industry and in buildings, the needs to build up a proper institutional environment for energy efficiency in Slovenia became very

[1] Energetski zakon, Off. G. RS 79/99
[2] Resolucija o strategiji rabe in oskrbe Slovenije z energijo, ReSROE, Off. G. RS 9/1996

important. That is why a number of energy efficiency programmes have been designed and supported by the governmental budget and by the PHARE Programme.
The goal of subsidising energy audits and energy consulting is to develop energy service market and to increase awareness and investments in energy efficiency.

2. Energy Audit Programmes

2.1 Energy Auditing Programme

2.1.1 Goals of the programme

With the process of privatisation approaching its completion, the Slovenian economy is facing a new development cycle, aiming at the increase of productivity, increase of the value added per employee, and decrease of operation costs. These efforts may also beneficially draw advantages from the potentials available in the area of energy efficiency. The analyses completed in recent years[3], confirm potential savings in excess of 20% of energy bills arising from economically attractive investments (with payback periods under 3 years), and capable, in this manner, to increase competitiveness while also contributing to the environment protection.

In Resolution on the Strategy of Energy Use and Supply was declared one of the main goals, to improve overall energy efficiency by 2% per year.

The Kyoto protocol that Slovenia signed[4] Slovenia on 21st October 1998, obligates Slovenia to decrease greenhouse gases emissions in the average for 8% by the year 2008 to 2012, regarding the base year 1986.
Energy audit could significantly contribute to higher energy efficiency in industry and buildings that would contribute also to higher industrial competitiveness and GHG mitigation.

The energy auditing programme is aimed at introducing energy management and promoting energy efficiency investments. An energy audit results in a list of proposals of organisational measures and investment proposals. It presents a basis for developing a site strategy to reduce energy consumption and increase energy efficiency. The audits have to be performed according to the common methodology. The audits are subsidised by up to 50% of the total costs.

2.1.2 Target sectors

Energy Auditing Programme is targeted to industrial sector processes and buildings and also to residential and public buildings.

2.1.3 Administration

The administration of Energy Audit Programme has been done by the Ministry of Environment and Spatial Planning, Agency for Efficient Energy Use. The administration includes planning, financing, contracting, monitoring and evaluation and promotion. For the phases of monitoring,

[3] AEA Technology plc, ETSU, IJS, 1996. *Study on Energy Conservation Strategy in Slovenia.* Harwell, UK.
[4] Kyoto protocol has not yet been ratified in parliament.

evaluation and promotion specialised organisations are engaged (Institut "Jožef Stefan"-Energy Efficiency Centre).

2.1.4 Implementing Instruments

Subsidies
Subsidising energy audits of companies and multi-apartment buildings is limited in the range of 1.100 to 8.600 €, but not more than 50% of the energy audit eligible costs. Some additional subsidy (to 1.000 €) can be given for the promotion of energy efficient use of energy (awareness and information activities) to tenants in case of multi-apartment building.

Table 1: Overview of schemes/instruments linked to energy audits

Mandatory / legal schemes	**Voluntary schemes**
No link of energy audits to mandatory schemes	Participation in the Energy Auditing Programme is voluntary, limited by budgets available. But when the contract for the subsidy is signed, an energy audit should be done by the appropriate methodology, otherwise the subsidy is retained.
Fiscal incentives (taxes)	**Fiscal incentives (subsidies)**
No link to taxation (e.g. CO_2 tax)	Energy audit can be subsidised up to 50% of eligible costs. Sites with energy audits are more competitive in case of getting loans from Energy Efficiency Fund.
Marketing oriented schemes	**Policy issues**
Promotion activities: www.mgd.si/aure, workshops, seminars, marketing by energy auditors selling their services	Energy audits are indirectly mentioned in Energy Law and explicitly in GHG mitigation strategy and Action plan.

2.1.5 Energy Audit Models

The Methodology defines three different types of energy audit:

1. Preliminary energy audit: the simplest way of energy audit based on one day visit of company or building and data of energy use.
2. Core audit recommended for simple and easy- to-understand cases.
3. The energy audit model that is precisely described by Methodology and the only one type of energy audit that can be subsidised.

Energy audit realisation scheme is presented in the following picture.

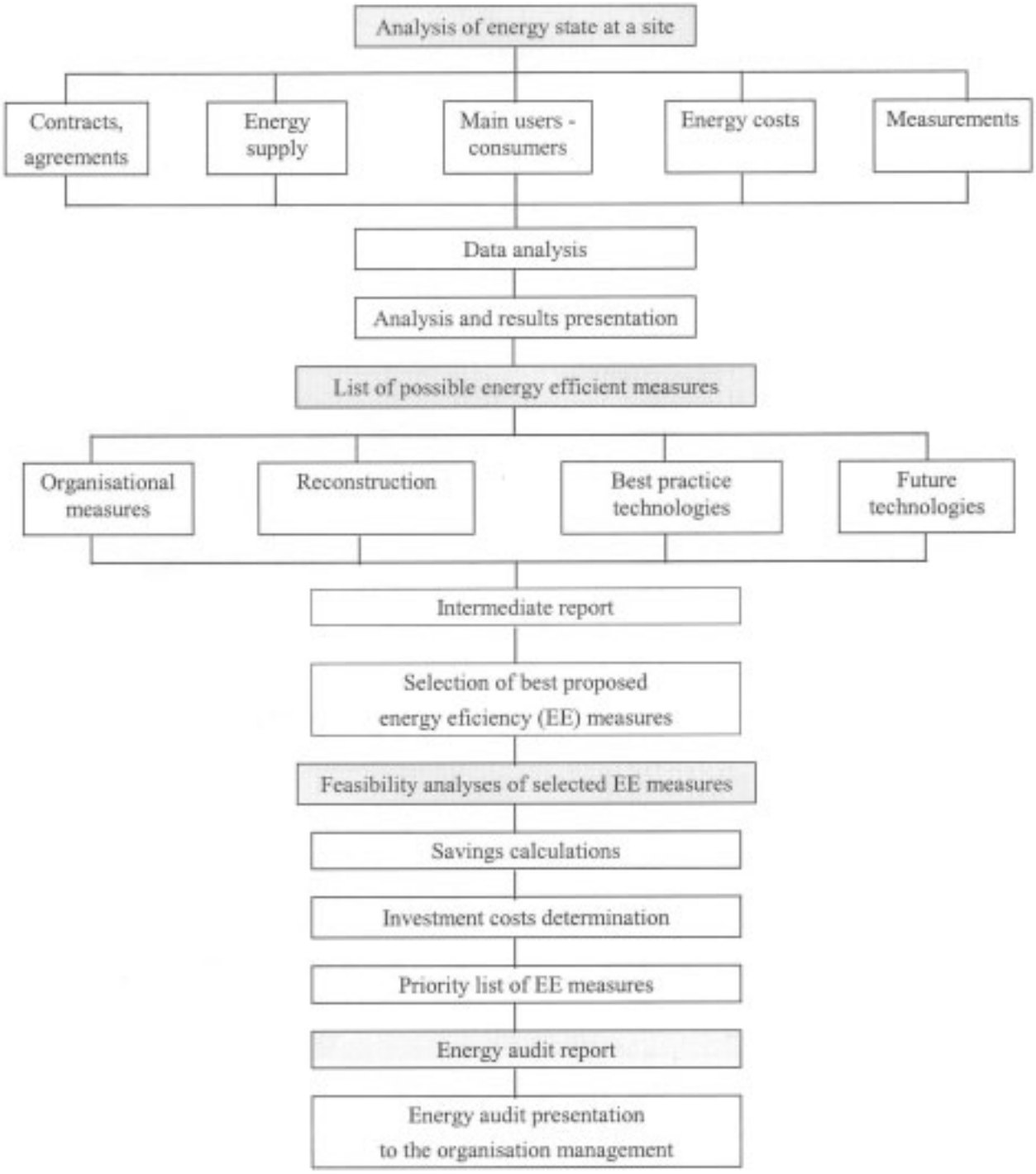

Figure 1: Energy audit elaboration scheme

2.1.6 Auditors' Tools

The Energy Audit Realisation Methodology and Energy Audit Handbook were developed between 1994 and 1997 to assure energy audit quality. The Methodology is obligatory in case of subsidised energy audits[5].

The Energy Audit Realisation Methodology is a part of public call documentation and is applicable for industrial sites and residential buildings.
Energy Audit Handbook is suggested to be applied at energy audit. Every one can get it for free at Agency of the Republic of Slovenia for Efficient Use of Energy or download for free at its web side.

2.1.7 Training, authorisation and quality control

Information, education and promotion activities are carried out by means of publications, seminars, workshops, exhibitions and similar events. These activities are significant for the increasing the level of information, awareness and qualification, both of energy consumers and those cooperating with them.

In the domain of industry, a number of seminars, workshops and training courses have been organised in the last five years, on the topics of: energy auditing, energy management, energy efficiency in SMEs, safe and economic boilers operation, efficient compressed air systems and financing of energy efficiency and cogeneration projects. In addition to the above mentioned topics several booklets were published.

2.1.8 Results, Monitoring, Evaluation

All energy audit reports have been reviewed by an independent expert organisation (mostly by Energy Efficiency Centre of "Jožef Stefan" Institute).
With a purpose to define the real effect of energy audits a detailed analysis on energy audits quality and realisation was made in September 1997. 84 % of industrial and public (buildings) organisations that were audited in 1995 and 1996 (PHARE audits excluded) answered the questionnaire.

Table 2: Energy audit evaluation results

INDUSTRY & BUILDINGS	
First year energy cost reduction, caused just by energy audits	327.000 €
Energy Audits cost	372.000 €
National subsidy for Energy Audits	134.000 €
Ratio between first year energy cost reduction and National subsidy	2,4
Payback time (subsidy/savings)	5 month
Payback time (energy audits cost/savings)	1,1 year

Energy audits since 1997 have not yet been evaluated.

[5] Some energy audits have been carried out in industrial companies without subsidies.

In 1998 PHARE project Evaluation of the Energy Conservation Programme in Slovenia was performed by ALLPLAN that also evaluated the Energy Auditing Programme. The findings of this evaluation regarding audits:

- audits should be encouraged when energy savings seem promising to lead to investment projects (supported by the Agency, the Fund and companies own resources),
- objectives, expected results and evaluation method for energy auditing programme should be clearly defined.

2.1.9 Observations and future plans

The energy auditing programme should clearly define objectives, expected results and evaluation procedure. It should persist on reporting on economic efficient measures and projects realised due to energy audits.

3. Other Programmes including Energy Audits

3.1 Energy Advisory Network in Slovenia – ENSVET

3.1.1 Goals of the programme

The general objective of the ENSVET is to raise the energy efficiency awareness among the households and in improvement of the technical culture level in general. This activities are expected to contribute to the goal in the energy efficiency improvement of 2 % per year, that is one of the goals set in the Resolution on the Strategy of Use and Supply of Energy for the Republic Slovenia. The Energy Advisory Network (ENSVET) in Slovenia has a status of the project with objectives and scope targeted to match the goals of the Agency for Efficient Energy Use Energy Advisory programme.

The basic principles within this programme is to overcome the following barriers:
- low interest for the implementation of energy efficient (EE) measures,
- low awareness of general public about EE and environmental topics,
- insufficient supply of EE products.

3.1.2 Target group

The energy advisors offer advises to the households with the aim to raise EE awareness, to promote and stimulate implementation of energy efficient measures and the use of renewable energy sources. Also they take part in education of new advisers, contribute to promotion of the ENSVET and energy efficiency, improving their knowledge and transferring new approaches in operational scheme of the project. Advises are free of charge for the customer.

3.1.3 Administration

The ENSVET programme started in 1991 with the background activities for establishing the Energy Advisory Network (ENSVET) with support of the bilateral Slovenian-Austrian (Styrian) initiative. The programme with the activities is being financed by the Agency for Efficient Energy Use and prepared in cooperation with Civil Engineering Institute ZRMK from Ljubljana.

3.1.4 Implementing Instruments

The programme includes some basic activities such as advising, promoting energy efficiency, education and training of energy advisers and supporting activities in connection to other Agency for Efficient Energy Use projects (like control inspections for EKO fund, granting subsidies, awareness raising campaign).

3.1.5 Energy Audits within Programme

We can say, that energy advisors are making some sort of energy audits of buildings and households just on basis of data and information given mostly by the owner (no site visits).

3.1.6 Training, authorisation and quality control

One of the preferential tasks within the ENSVET project was introduction of licences for energy advisers in order to increase energy advisers' personal responsibility and increase the quality of his service. Licences are based on ENSVET's internal regulation concerning the way of acquiring the title of energy adviser, working responsibilities, commitments, rewards, etc.

3.1.7 Results

Statistical Data:
- 24 energy advisory offices and 9 branch offices were established all over Slovenia,
- 114 energy advisers were educated in 4 courses (1992, 1994, 1995 and 1997), at the moment 73 energy advisers cooperate actively in the project.

Accomplished Results:
- since 1992 more than 10.000 written advices were carried out and in addition more than 2.500 oral advices were given,
- over 350 public lectures on various locations (local communities, schools, etc.) were performed.

Promotional activities: over 600 articles in local and national newspapers were published, over 500 radio and CTV emissions, 6 educating TV emissions were broadcasted, over 25 exhibitions of selected topics energy efficiency on various locations were arranged, in 5000 households the Public opinion inquiry about energy and fuel consumption in households was carried out, promotion of the project ENSVET carried out on annual fairs.

3.1.8 Observations and future plans

Some of the experiences gained have already been used in energy auditing in industry. The project can be upgraded with improvement communication skills and/or with service on advising the citizens also the basic financial and investment aspects of energy efficiency and renewable energy investment and/or advisory service to the municipalities while preparing, drafting, deciding, implementing and monitoring the municipal energy concepts.

3.2 Voluntary Agreements (Planned)

3.2.1 CO_2 Tax regulation

CO_2 Tax Regulation was introduced by the Ministry of Environment and Spatial Planning in 1997 and it is one of the essential economic instruments for stimulating reduction of CO_2 emissions and energy consumption. It is motivated by reaching Kyoto target for Slovenia (-8 % reduction of GHG emissions form 1986 to 2010).

CO_2 tax is currently obligatory for all energy users, but the tax rate depends on the type of consumer (industry, district heating system, households, etc.).

3.2.2 Voluntary Agreements and CO_2 Tax exemptions

Currently running CO_2 Tax regulation is going to be modified in such a way (by the middle of 2002) that it will offer CO_2 tax exemptions up to 80 % for energy intensive industry (IPPC obligors) using voluntary agreement model between company and Ministry of the Environment and Spatial Planning.

Using Voluntary Agreement model, IPPC obligated company could assure certain CO_2 emissions reduction by investing in energy efficiency. Considering investment costs and CO_2 mitigation, tax exemption will be defined.

Energy audits are stimulated indirectly by CO_2 tax and voluntary agreements, because very good defined and analysed energy efficient investments (e.g. by energy audit) can guarantee CO_2 mitigation.

An independent competent institution is foreseen for approving company's investment and CO_2 reduction plan, and for monitoring of the investment realisation and achieved CO_2 reduction on yearly basis.

4. Other Activities including Energy Audits

4.1 Energy consulting to larger industrial energy consumers

4.1.1 Project goals

The project aim is to raise information and awareness in the field of energy efficiency and energy management in enterprises with high energy bills. The project goal has been set to overcome information barriers and, through transferring independent and direct information to managing staff and energy operators, to activate internal potentials for increasing efficiency of energy use. The special project focus has been set on introducing energy management and modern energy technologies as well as setting up enterprise energy strategy, which starts with the carrying out of basic organisational measures of reducing energy costs and later embraces energy projects.

4.1.2 Funding

Project is 100% financed by the Ministry of the Environment and Spatial Planning - Agency for Efficient Energy Use in Slovenia.

4.1.3 Project results

Energy consulting to larger industrial energy consumers started in 1997. The project focused on industrial enterprises with a yearly energy bill between 0.5 and 5 Mio €.

Energy consulting was carried out in 44 industrial companies, in a hospital, in a municipal sewage draining – water supply system and in a chain of department stores. The companies involved in the project had a total annual energy consumption of 2,483 GWh, and their annual energy bills totalled to almost 50 Mio €.

The methodology of energy consulting programme was developed including questionnaires on company activities in energy efficiency and energy management as well as on energy use patterns.

For each company an energy survey and guidelines for further work in the energy field were elaborated. Further an information event for managing staff and a lecture for employees were held in each company.

Despite the fact that the basic purpose of the project was increasing of information and awareness on how to implement energy management in an organisation, the project has brought concrete effects as well.

The analysis of the questionnaire on the results and quality of energy consulting programme showed that those companies which carried out proposed simple energy saving measures (57 % of all), achieved a total annual energy bill reduction of almost 1.4 Mio €. An analysis of project results has shown that yearly savings achieved within a few months after the project completion exceed the project cost by more than fifteen times. Very positive comments from general managers have confirmed the project approach.

4.1.4 Connection with energy audit

Energy consulting includes a walk-through audit of a company, a senior management event and an awareness event for employees. One of the project outputs is also an analysis of energy consumption and costs (e.g. core audit), suggestions for immediate actions and proposals for further activities. When appropriate, an energy audit is recommended.

4.1.5 Future plans

Further exploitation of energy consulting project is still in the phase of decision (since in 2000 last consulting was made).

4.2 Fund for Energy Efficient Investments

4.2.1 Goals and target group

The national budget financial sources available for the energy efficiency investments are not sufficient for the realisation of the goals of the national energy strategy. Therefore, an Energy Efficiency Investment Fund was established in January 1998. The fund goal is to provide the industrial enterprises, institutions and building managers with financial resources under attractive interest rates, and thereby, to decrease energy costs in the long term.

4.2.2 Operation of Fund

Fund is managed by the Bank Austria, which was selected in a public competition. In this manner, a rational granting of loans is secured. The fund is supplied from a mix of financial sources. The commercial part of the fund is provided by the fund manager. An attractive all-in interest rate on the level of 60 % of commercial interest rate is achieved by a grant from the national budget of the Republic of Slovenia and by a zero-interest loan granted by the European Union PHARE Programme. Contributions by other donors are also foreseen. The initial fund balance is 12 Mio €. The fund operates on a revolving principle. The planned term of fund operation is ten years.

4.2.3 Connection with energy audits

Energy audits are stimulated indirectly, because just very good defined and analysed energy efficient investments (e.g. by energy audit and/or feasibility study) can be competitive for financial resources.

4.3 Seminars, Workshops, Awards

4.3.1 Goals

The objectives of the promotional and educational activities are to raise the level of awareness of energy auditing as a management technique among senior managers and energy managers in the industrial and building sectors in Slovenia, to improve the energy auditing skill base of in Slovenian consulting companies, and to provide recommendations for a future national energy auditing programme.

4.3.2 Results

Training of auditors included three one week courses on short energy audits, on comprehensive energy audits in industry and comprehensive energy audits in buildings.

Training of energy managers and senior managers comprised three one-week courses for energy managers in industry and in buildings and a half day senior management event.

Several one day seminars have been organised on different topics:

- energy efficient compressed air systems,
- energy efficient motors and variable speed drives,
- energy efficient boilers,
- several handbooks and brochures were published in connection with seminar topics: "Efficient use and production of compressed air", "Efficient use of energy by electric motor drives", "Municipality energy concept", "Combined heat and power production", "Gas fuels and appliances for space and water heating", etc.

Comprehensive Energy Auditing Guidebook was prepared to be used mainly by energy auditors and eight energy efficient demo projects leaflets were prepared to show realised energy efficient examples.
Organisation and realisation of a study tour to UK and Denmark for the staff of the Agency for Efficient Energy Use in Slovenia was aimed to gather experiences regarding energy auditing and auditing schemes.
Some new seminars for energy auditors and energy managers are planned in the near future.

4.3.3 Providing institutions

Several Slovenian and foreign institutions and experts are collaborating and giving lectures on seminars and workshops. The most important are (or were in the past):

- "Jožef Stefan" Institute - Energy Efficiency Centre, Ljubljana, Slovenia,
- Agency for Efficient Energy Use in Slovenia,
- Building Institute ZRMK, Slovenia,
- MARCH Consulting, United Kingdom,
- COWI Denmark.